PUBLIC HEALTH ACT,

(11 & 12 Vict., cap. 63).

14378

REPORT

TO THE

GENERAL BOARD OF HEALTH,

ON A

PRELIMINARY INQUIRY

INTO THE SEWERAGE, DRAINAGE, AND SUPPLY OF WATER, AND THE SANITARY CONDITION OF THE INHABITANTS

OF THE BOROUGH AND PARISH OF

EAST RETFORD,

AND THE PARISHES OF

WEST RETFORD, CLARBOROUGH, AND ORDSALL.

BY WILLIAM LEE, Esq., C.E.,

SUPERINTENDING INSPECTOR.

LONDON:

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FOR HER MAJESTY'S STATIONERY OFFICE.

1849.

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NOTIFICATION.

THE General Board of Health hereby give notice, in terms of section 9th of the Public Health Act, that on or before the 18th of August, written statements may be forwarded to the Board with respect to any matter contained in or omitted from the accompanying Report on the Sewerage, Drainage, and Supply of Water, and the Sanitary Condition of the Inhabitants of the Borough and Parish of EAST RETFORD, and the Parishes of WEST RETFORD, CLARBOROUGH, and ORDSALL, or with respect to any amendment to be proposed therein.

By order of the Board,

HENRY AUSTIN, *Secretary.*

Gwydyr House, Whitehall,
12*th June*, 1849.

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PUBLIC HEALTH ACT (11 and 12 Vict., cap. 63).

Report to the General Board of Health on a Preliminary Inquiry into the Sewerage, Drainage, and Supply of Water, and the Sanitary Condition of the Inhabitants of the Borough and Parish of East Retford, *and the Parishes of* West Retford, Clarborough, *and* Ordsall. By William Lee, Esq., C.E., Superintending Inspector.

Gwydyr House, June 11, 1849.

My Lords and Gentlemen,

The burgesses of East Retford having petitioned the Board for the application of the Public Health Act, I proceeded, in obedience to your directions, to make a preliminary inquiry into the sewerage, drainage, and supply of water, and the sanitary condition of the inhabitants. The investigation was commenced on Friday the 9th day of March, in the Town Hall of East Retford, and continued on the 10th and 12th. Nearly all the members of the town council were present, besides a large number of influential inhabitants.

After proof of the publication of the notices, I explained the several objects of the inquiry, and, according to your instructions, informed the meeting that it was the intention of the General Board of Health to secure the interests of the ratepayers by taking care that the works to be executed should be efficient and economical, and that no parties should be charged beyond the actual benefit to be derived in each case from the provisions of the Act.

I then asked the superintendent registrar for the list required by the ninth regulation of the Board, showing the places where epidemic and endemic diseases had occurred. Mr. Bigsby, the registrar, prepared one in the room, with the assistance of the medical officers of the Union.

In addition to the list I made minutes of other localities to which my attention was directed by individuals present, and then proceeded to a careful inspection of the borough, during which I was accompanied by John Charles Hall, Esq., M.D.; Alderman Gylby, surgeon; Thomas Phillips Davies, Esq., medical officer of the Union; Samuel Francis Flower, Esq., surgeon; George Chapman, Esq., surgeon; William Newton, Esq., town clerk; John Hudson, Esq.; William Fisher, Esq.; Mr. John S. Piercy, surveyor; Mr. John William Allen, surveyor. To these and other gentlemen I am under considerable obligations for the hearty manner in which they assisted me during the inquiry.

In consequence of other urgent applications to the Board, the preparation of my Report was delayed; and in the meantime the adjoining parishes of West Retford, Clarborough, and Ordsall, having also petitioned the Board, I thought it prudent to defer any Report on East Retford until I had concluded the preliminary inquiries in all, because parts of each of the three parishes are included within the *town* of Retford. On the 5th and 6th instant, therefore, I conducted the inquiry respecting West Retford; on the 7th for Ordsall; and on the 8th and 9th for Clarborough.

After proof that the notices of the inquiry had been duly published, I stated that as most of the gentlemen present were also present at the previous inquiry into the condition of the borough, it would be unnecessary for me now to go into detail as to the provisions of the Public Health Act, the objects of the General Board of Health, or the duties of the inspectors. As, however, there was an important distinction between the application of the Act to the limited area of the borough, almost entirely built up, and the parishes forming the subject of the present inquiries, containing an extensive area of agricultural land, I thought it right to explain the advantages which would result to the farmer from the inclusion of such land within the district, namely, that he would be able to drain his land more efficiently and economically than by any other means, because through the medium of the local Board he could avail himself of the experience and scientific knowledge which it was the object of the General Board of Health to apply to each locality. That the repayment for land drainage so constructed could be distributed over a lengthened period, and thus the improvement would be immediate, but the outlay not at all felt as a burden. That the application of the Health Act to land in the vicinity of a town as a means of drying the atmosphere and improving the health of the inhabitants, would thus afford at the same time a most satisfactory solution of the difficult question between the landlord and tenant-farmer of improved value arising from such works, and that the provision was peculiarly valuable in cases of short tenure, because an incoming tenant would have to pay the remaining annual instalments as private improvement rates. That the farmers would further have the means of giving increased fertility to their land by the application of the refuse of the town in a liquid state—the most efficacious and economical form in which manure can be applied.

I stated that the farmers residing at a distance from the town need be under no apprehension that along with these great advantages they would be called upon to pay for improvements in which they could not participate, such as water supply, sewerage, and the works *generally* included under the heads of "private improvement rates" and "special district rates." That they would unquestionably be liable to the general district rate, for management, salaries, office expenses, &c., but that the 88th section of the

EAST RETFORD.



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Public Health Act provided that even for these purposes the land should only be rated at one-fourth of its net annual value.

I am happy to inform the Board that these explanations were satisfactory, and that a wish was immediately expressed that the whole of the several parishes should be included within the district.

The town clerk put in the consent of the Council, under the common and corporate seal of the borough, to the constitution of a district not exclusively consisting of such borough. I have appended the document to this Report.

At the inquiry conducted in March the corporation and witnesses concurred in the opinion that, from its insulated position and confined area, the sanitary condition of the borough could not possibly be improved without including at least portions of the parishes of West Retford, Clarborough, and Ordsall. From that conviction the Council had caused a plan to be prepared showing boundaries which they recommended as the most limited that could be taken for all the purposes of the Act. I am authorized, however, by the town clerk to say that the Council fully approve of an extension of the boundaries *then* proposed, so as to include entirely the three parishes that have since petitioned.

Where the "proposed boundaries," therefore, are mentioned in the evidence, the Board will understand that the recommendation extends over the borough of East Retford, and the parishes of West Retford, Clarborough, and Ordsall.

Mr. Bigsby presented lists of the places where epidemic, endemic, and contagious diseases had occurred. The following are the localities :—

East Retford—Beardsall's-court, Grove-street; Beardsall's-row, Sutton's-row, Horse and Jockey-yard, Moss's-row.

West Retford—Back of the Mermaid Inn-yard.

Ordsall—Thrumpton, Ordsall village.

Clarborough—Spittal-hill, Moor-gate.

On my second visit in June I made a full inspection of the parishes of West Retford, Ordsall, and Clarborough, and was accompanied or otherwise assisted by many gentlemen to whom I was previously under obligations, and whose kindness I have already mentioned in this Report. In addition I am bound to add the names of Mr. Alderman Watson, West Retford; Thomas Bigsby, Esq., the Hall, West Retford, superintendent registrar; Samuel Marshall, Esq., medical officer for Clarborough parish; Mr. William J. Hudson, Ordsall; Mr. John Lane, Ordsall; Mr. Dawber Cooke; Mr. Frederick Hill; Mr. John Redgate, relieving officer for Ordsall; Mr. William Alexander Cartwright, deputy manager of the Chesterfield Canal; Mr. John Lawton, maltster; Mr. Phillips, owner of Brick-yard.

Description of the District.—East Retford is a borough and market-town, locally situated in the North Clay division of the wapentake of Bassetlaw, in the N. division of the county of Nottingham. The town is supposed to have derived its name from an ancient ford over the river Idle, at a spot where the soil is a reddish clay.

East Retford is an ancient borough by prescription, and a royal demesne. King Edward I. granted it (1279) to the burgesses at a fee-farm rent of 10*l.* per annum, with the privilege, among others, of choosing a bailiff from among themselves. Several charters were granted by Edward III., Henry VI., and James I., confirming and extending the liberties of the inhabitants. It is unnecessary, however, to allude further to these documents, inasmuch as the Municipal Reform Act effected a considerable alteration in the constitution of the corporation. The government is now vested in a mayor, four aldermen, and twelve councillors. The corporation is possessed of considerable property, including a water corn-mill and a paper-mill; also of extensive house property in East Retford, and of lands in the parishes of Clarborough and Ordsall. The income is about 1000*l.* per annum.

The boundaries of the borough and parish of East Retford are identical, and form only the centre or nucleus of the town of Retford. The area is 130 acres, about one-third of which is pasture and gardens, and the remaining two-thirds are occupied by buildings and streets.

The parish of West Retford is separated from the borough of East Retford by the river Idle, and contains 1080 acres of land. An hospital was founded here in 1664 by Dr. John Darrell, and dedicated to the Holy Trinity; it is endowed for a master and sixteen brethren, and it is stated in Piercy's 'History of Retford' that nearly the whole of the landed property in the parish belongs to the hospital, and the "Church and poor."

The parish of Clarborough is on the north-east side of the borough of East Retford; and though the village of Clarborough is about two miles distant, several of the hamlets within the parish form part of the town of Retford. Moor Gate and Spittal Hill are in the parish of Clarborough, and contain about one-fifth of the population of the town; they are divided from East Retford only by a small stream or ditch of stagnant water. The parish comprises the hamlets of Clarborough, Bollam, Little Gringley, Moorgate, Spittal Hill, and Welham, and contains 3870 acres of land, whereof the township of Clarborough includes 1230 acres.

The parish of Ordsall lies on the south of East Retford, and contains 1930 acres. It is divided into the lordships of Ordsall and Thrumpton; the latter would be supposed by a stranger to form part of East Retford, as it includes the southern suburbs of the town.

Thus it appears that the borough of East Retford, though the

most important, forms only a portion of the town of Retford, which includes, besides the borough, the most densely populated parts of the several parishes of West Retford, Clarborough, and Ordsall.

It will be seen hereinafter that the sewerage, drainage, supplies of water, and the sanitary condition of the inhabitants of all these *four* places are alike defective; and I would therefore premise, in order that the Board may better understand the bearing of the facts which came under my own observation, and the evidence of the witnesses, that, after the most careful consideration, I feel it my duty to recommend the formation of a district, consisting of the borough of East Retford and the non-corporate parishes of West Retford, Clarborough, and Ordsall.

There is no local Act of Parliament in force within the borough, or within any of the said parishes for paving, lighting, cleansing, watching, regulating, supplying with water, or improving the same, or having relation to the purposes of the Public Health Act.

General Contour and Geological Character of the site of the Town.—Nearly the whole of the town of Retford lies in the valley of the river Idle, which is formed by the junction of two streams—the Maun and the Meden: the former takes its rise between Kirkby and Newstead Abbey, and the latter in the vicinity of Hardwick, near Sutton in Ashfield. The two unite near Elksley, about three miles south of the village of Ordsall, and the stream takes the name of the Idle. It passes through the parish of Ordsall on the east side of the village, and runs in a northerly direction between the parishes of East and West Retford, and afterward between the parishes of West Retford and Clarborough. Its course would be naturally very sluggish, but it is entirely impeded by the embankments connected with several mills, which have existed from a very remote period. The site of a considerable part of the town has been undoubtedly at some time a swamp; it is still occasionally subject to floods, and under the present arrangements no outfall can be obtained for deep drainage of the buildings.

A commission was appointed in the 37th of Henry III. to cause this part of the river Idle to be cleansed and scoured, "in regard that by their obstructions with sand, weeds, and the like, the lands and meadows of divers persons had been overflowed and drowned."

Again, in 1388 William de Skipwith, Robert de Morton, Oliver de Barton, Elias de Thoresby, John de Bekering, William Power of Tylne, and John de Whetlay, were constituted commissioners "to view the course of the river Idle, through the towns of Elkessay, Gamelstone, Eton, *Ordeshall*, *Est Redforde*, *West Redforde*, Bolum, Tylne," &c., "which, for want of cleansing, had drowned the lands of sundry persons, and to cause the same to be scoured."

I find it stated in Mr. Piercy's History of Retford that—

"On Tuesday the 11th of February, 1795, a flood came which was so sudden in its rise, that many of the inhabitants had not time to remove their goods, and, consequently, became considerable sufferers. A grocer's shop and part of the house occupied by Miss Hurst were washed down, and four others nearly destroyed. In East Retford it was upwards of three feet deep in the Market-place, and the torrent ran so violently as to tear up the pavement in different parts of the town, which was nearly all more or less under water."

The town would still be subject to similar disasters but for the existence of several sewers or becks,—open ditches running through the town nearly parallel with the river, and which tend to relieve it of surface-water.

I shall have hereafter to allude to the polluted state of these ditches, and to their inefficiency for the removal of the town refuse.

East of the river in the parishes of Ordsall and Clarborough the ground rises to a height of probably 50 feet above the level of the river, and forms a ridge parallel to the stream; but, with this exception, the contour of the town is very unfavourable for the discharge of surface-water.

The soil of the district varies considerably. On the west of the river there is a great deal of light sandy soil which is sometimes blown in high winds, and much more that would be so removed but for the admixture of pebbles. On the north-east is a black soil which has been famous for the production of hops.

In Clarborough generally there is clay which might be made very fertile. In Ordsall and West Retford the soil is chiefly of a sandy nature, but very productive. The two kinds of soil are commonly distinguished in the locality by the terms grass land and turnip land.

The geological strata of the district is the new red-sandstone system. This is overlaid on the west side of the valley by diluvial drift, which appears to vary from 9 to 15 feet thick, and produces the light sandy soil already described. The red marl and gypsum appear on the east, and form the higher table-land. North-east of the town, in the direction of Bollam, the marl forms a soft sandstone cliff, which has been scooped out in several places so as to form dwelling-houses and stables, with the fronts only of masonry. In the valley between the marl and the drift there is an alluvial deposit from the river, and upon this the greater portion of the town is built.

The sandstone and marl, on the one hand, and the drift on the other, being both very permeable, and the river having little fall, besides being dammed up for mill purposes, it follows that the low land upon which the town stands is entirely saturated with water. In most parts of the town water rises to within 4 or 5 feet of the surface.

Fine gypsum is obtained from pits at Gringley in the parish of Clarborough, and used as plaster of Paris in forming the floors of many houses in the town.

The climate in the neighbourhood of Retford is said to be more equal, especially with reference to temperature, than that of the surrounding counties; and the rain-fall has only amounted to 30 inches per annum in four years out of the last twenty, although on the Yorkshire and Derbyshire hills within 40 miles it ranges from 40 to 60 inches per annum.

Mr. John S. Piercy has for many years kept records of the meteorology of the district. I am indebted to him for the following hydrometrical statistics:—

Depth of rain fallen at East Retford, in the county of Nottingham, during the last 10 years, viz.:—

	Inches.
1838	22·875
1839	31·850
1840	23·100
1841	28·275
1842	26·950
1843	22·125
1844	16·440
1845	25·781
1846	26·220
1847	20·665
1848	31·362
Average mean depth of 10 years	27·564

The 10 previous years:—

	Inches.
1828	31·850
1829	29·975
1830	24·900
1831	31·950
1832	23·875
1833	23·050
1834	19·850
1835	22·900
1836	26·875
1837	26·125
Average mean depth of 10 years	26·135
Mean average of 20 years	26·838

Public Buildings, Trade, and Manufactures.—Of the public buildings of the town I have already named the Hospital of the Holy Trinity, in West Retford. Sloswicke's Hospital, in East Retford, was founded in 1657 by Richard Sloswicke, who gave his dwelling-house to be converted into a *Maison de Dieu*, and endowed it with property, from which six men were to receive 3*l.* 6*s.* 8*d.*

annually. It was rebuilt by the Corporation in 1806, and is inhabited by aged burgesses and others. The estate now lets for 85*l.* a-year. There are also nine other almshouses. Besides a church in each parish, there is a chapel of ease in Clarborough, and also chapels belonging to the Wesleyans, Independents, and Baptists. The Grammar School was founded by Edward VI., and is well endowed, but, owing to circumstances into which it is unnecessary to enter here, the building has fallen into decay. It is about to be rebuilt, but the present site, from its immediate contiguity to the beck dividing Spittal Hill and Moorgate from East Retford, is so damp and unhealthy, that the trustees look with considerable anxiety to the application of the Public Health Act in order to know whether the evils surrounding the present site can be effectually removed, or another situation must be sought for.

The town also contains national and other schools, and many benevolent and philanthropic institutions.

The Town Hall is a commodious and elegant building, in which are held the general quarter sessions of the northern division of the county. The shambles are underneath the court-room, and the Market is in the immediate vicinity. The Square is spacious, and surrounded by neat and elegant buildings, including the News-room, the Philosophical Society, the Bank, and numerous private houses. There are many noblemen's seats in the hundred of Bassetlaw, and the town being the capital of the district, its *external* appearance is that of a wealthy, elegant, and aristocratic place. As in all other towns, its defective sanitary condition is not to be looked for in the principal thoroughfares. The Union Workhouse is in the parish of Clarborough; it is well arranged, and stands on the most elevated position in the neighbourhood, but the drainage is most defective.

There was formerly a large trade in malting carried on here, but it has so fallen off that only about two kilns are now employed. There was also a good deal of hand-loom weaving; that occupation has entirely ceased. Three coach manufactories are carried on in the town, employing together about 30 men; and two tan-yards, with probably 25 men. There are no other trade manufactures. The geniality of the climate and the nature of the soil are peculiarly favourable to the early production of culinary vegetables. Potatoes, peas, and beans are largely cultivated for the market of Sheffield, 24 miles distant. The district about Retford is often called the market-garden of Sheffield. The lower classes about Retford are chiefly engaged in raising this produce and as general farm-labourers, or on the canal and the railways. Women are occasionally employed in light agricultural labour, such as picking stones from the land, hay-making, and binding sheaves in harvest. There is, of course, the usual proportion of tailors, shoemakers, blacksmiths, saddlers, &c., but no offensive

or injurious trade operation exists in the town. The great proportion of the males belonging to the lower classes follow healthy out-door occupations, and the causes of the excessive mortality must be sought for in and around their homes.

Ventilation of Streets and Private Dwellings, Crowded Habitations, and condition of Lodging-houses.—During my inspection I found many courts and passages without free circulation of air, and containing abundant sources of malaria.

Crawshaw's-yard in Wellington-street, is about 12 feet average width, and contains 14 houses with only 2 privies. Mr. Flower, surgeon, informed me that in 1832 he had the worst cases of cholera in his practice there.

Horse and Jockey-yard, Carrol Gate.—At one end of the houses is an accumulation of horse-dung, a very bad privy, and a piggery. John Stamp, railway labourer, one of the occupants, says:—

"I have lived here 7 years, but am not much at home. I pay 40*s.* a-year rent. Have had 10 children; 5 are now living; 1 died in this house, and I have only 1 at home. I am often poorly, and am always in the best health when I am away from home. My complaint is a low depressed condition. The privy is very unpleasant, especially in summer."

Beardsall's-court, in Grove-street, is a very close, ill-ventilated place. There is a privy under the bed-room of a house occupied by John Pearson. His wife says:—

"It makes everything damp, and we cannot use the room in winter. The pantry adjoins the privy, and smells very strong. The stairs are all wet from the same cause. We pay 4*l.* rent per annum."

St. John's-street is a narrow road, only about 8 feet wide, with a single row of flagstones along the centre, immediately under which is a drain, and the effluvium escapes through the joints of the pavement. There are houses on one side of this street, and a high wall on the other.

I have rarely found a worse place than the *Mermaid-yard in West Retford*, to which my attention was directed by the List of the Superintendent-Registrar. The houses are small and inconvenient. Many of them are in flats or floors, without any ventilation; and some of the sleeping places, as will be seen by the dimensions given below, are so small as to be unworthy of the name of rooms. The rents of these dwellings are very high, and yet all are occupied.

I have prepared a ground-plan and sections of the property, to show its close unhealthy condition. The following are some of the minutes made on the spot:—At the back of the yard are several tenements alike, one of which I examined. It contains two rooms: one is 14 by 11 by 7 feet; and the other 6 by 6 by

5 feet, occupied by two families consisting of six persons. These front into a filthy lane called Tenter Flat Back-lane. Underneath them, in the yard, are other similar dwellings. Altogether there are 21 tenements and 4 privies, 3 of which have one common entrance. On the east side of the yard is a stable, then an open cesspool containing a large accumulation of soil, and over it the three privies, entered by a flight of steps and a passage. Adjoining this is a chamber dwelling, also reached by a flight of steps. Underneath the whole of this house is a large piggery, in which there are sometimes five or six pigs. On the open surface of the yard in front was about a cart-load of pig-manure; and at the back of this and three adjoining houses is a farm-yard, in which pigs are kept, and containing a great quantity of litter. There are open crevices in the floor of the house-passage, which admit the stench from the swine into the rooms. The house includes 2 rooms; the size of one, called by a strange delusion on the part of the wife of the occupant, *the parlour*, is 12 by 12 by 6½ feet, and the other, the sleeping room, 6 by 9 by 6 feet. The rent paid for this miserable, unhealthy domicile is 3*l.* 5*s.* per annum, besides all rates. James Morrison occupies the next adjoining house, and pays 3*l.* 10*s.* and rates, for a living room on the level of the piggery and a chamber over it. He said, in answer to my inquiries:—

"I have lived here nearly 14 years, and have had 5 children since I came to the house; 3 are now living. I have a daughter 5 years old who is very weakly, and gone away to a relation in Ordsall to see if fresh air will do her any good. The air is not very good here. My wife is ill in bed up-stairs, and has been in that state 6 months. The doctors seem to do her no good. She seems in a decline. She has not been quite well for 5 or 6 years, and often has fever on her. She had faintings, with loss of appetite, and pains in the head and stomach before she was ill. She was a stout healthy woman before she lived here. I am a farm-labourer, and have now been sick two weeks. I began with shaking and shivering. I am under the doctor, and am somewhat better. Five years since I had inflammation on the lungs. My wife and I have not had good health for about 7 years. The wall of the house is damp, as you see, 4 or 5 feet high, and joins the piggery."

The surface of this yard is below the level of the street, and for want of any other outlet there is a drain under the floor of the next adjoining house, with an open gully close to the window. The refuse from all the property in the yard runs along the surface to this gully.

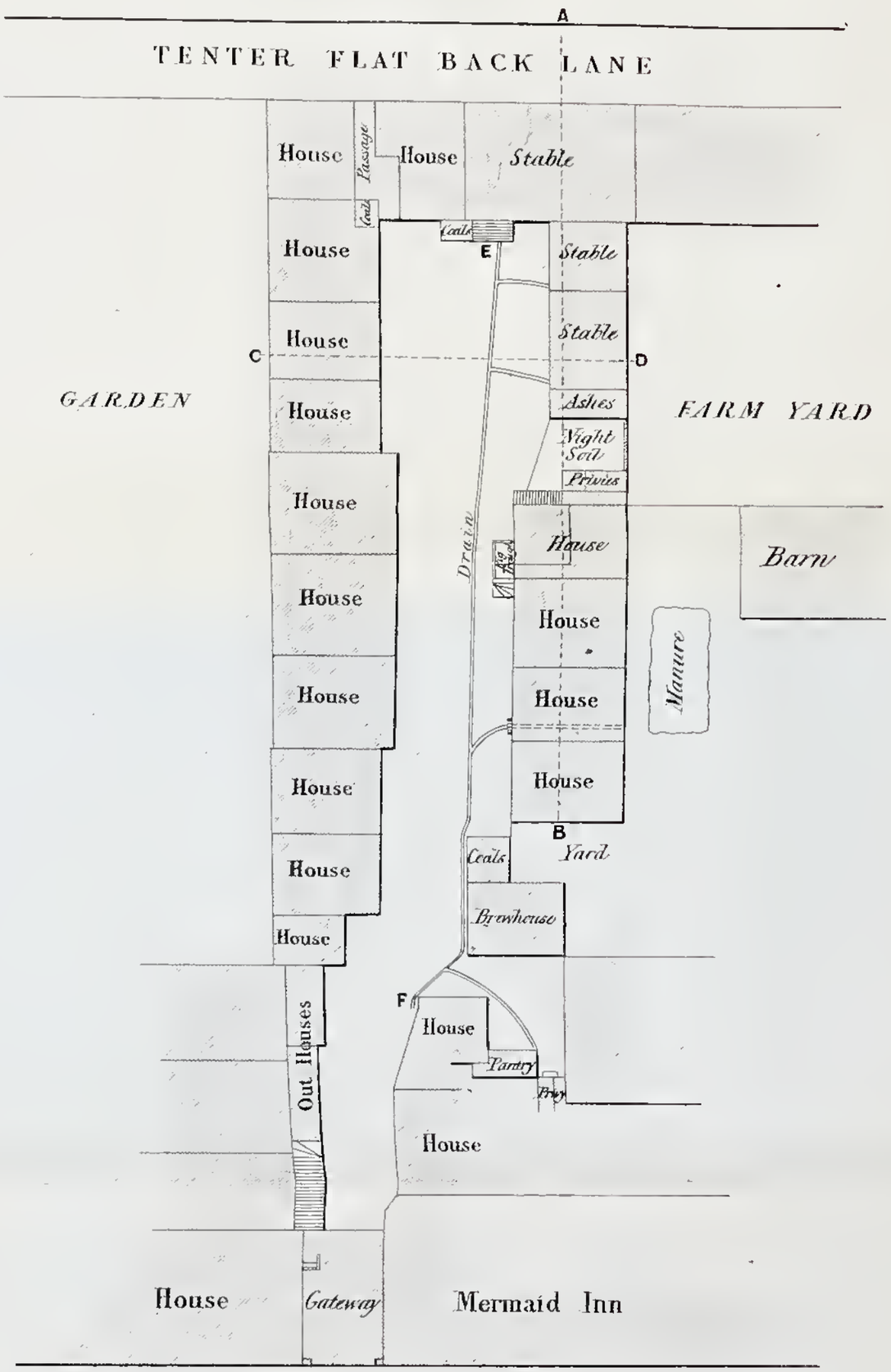
The house is occupied by Jonathan Ward, his wife, and a daughter unmarried, aged 45. The house and everything in it was remarkably clean and respectable. The daughter, who exhibited all the symptoms of low fever, said:—

"I am never well. I faint often, many times in a day. I have pains

RETFORD.

PLAN 1

MERMAID INN YARD.



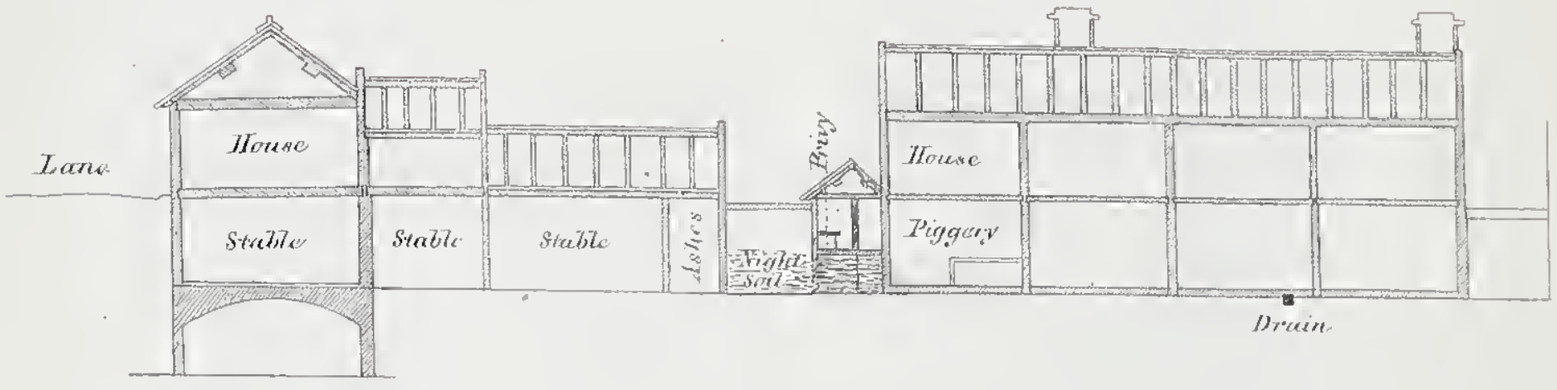
Stanfords Geographical Establishment, London.

RETFORD.

PLAN II.

SECTIONS IN MERMAID INN YARD.

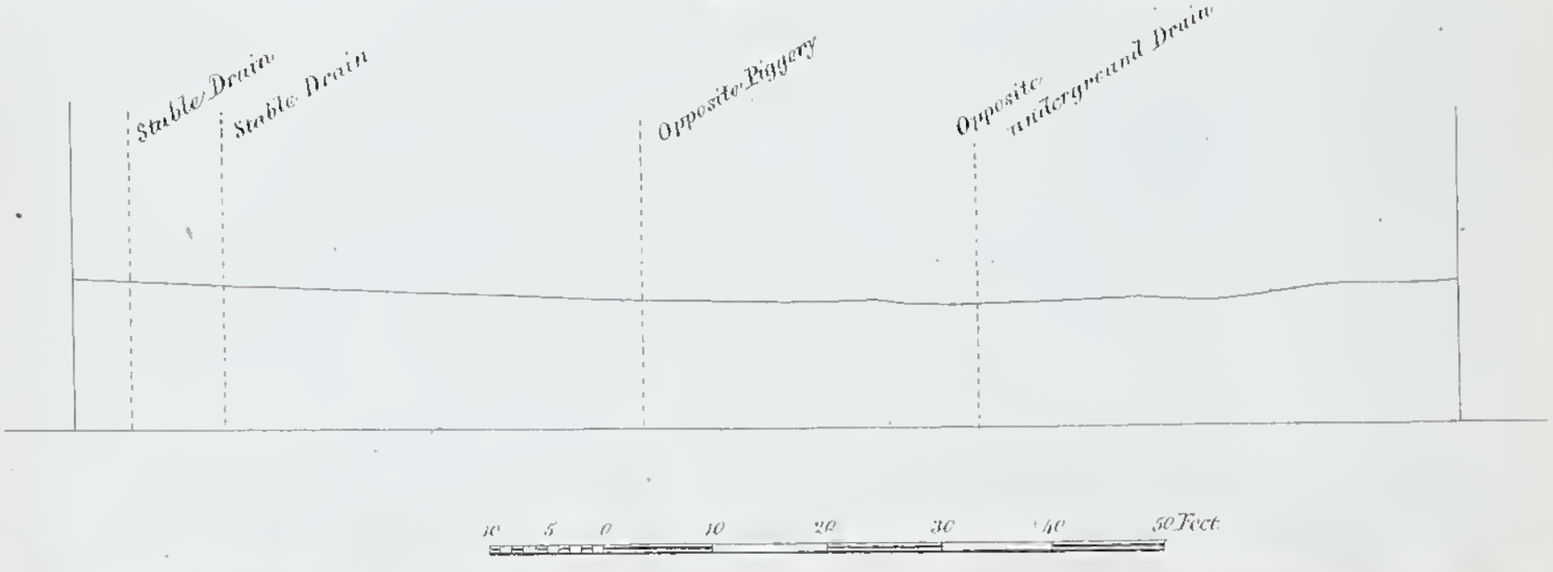
FROM A TO B.



FROM C TO D.



FROM E TO F.



116, p. 89.
Standidge & Co. Litho. Old Jewry.

in my head and stomach, with cold sweating. My mother is also very poorly. The piggeries smell very bad. Last night my mother and I went out a short time, and when we returned, and opened the door, the house stank abominably. I am anxious to leave the house, but my mother is getting old, and refuses to go."

The Rev. Thomas Francis Beckwith, B.D., says in his evidence—

"I have been vicar of East Retford 27 years. My office has afforded me peculiar opportunities of knowing the moral and physical condition of the inhabitants, and of the poorer classes especially. There are many close courts, and places ill-drained, badly paved, and ill-ventilated in the borough. The horse and jockey yard, some courts in Bridge-gate, Sutton's-row, Beardsall's-row, and Beardsall's-court are in this condition. Spittal Hill is in the parish of Clarborough, and therefore not within my jurisdiction, but I know that some there are in a bad state. I know St. John-street, and that there is a drain covered only with the flagstones, which have open joints. I consider that street a very close, confined place. East-street is a little wider and better ventilated; but if it be true that every street ought to be as wide as the height of the buildings, then I should say that it is too narrow. The courtyard behind Mr. Hudson's property in Carrol-gate and Beardsall's-yard are also confined places. I should say that where the people are depressed in their physical circumstances they are also in a low social and moral condition. There have been fevers in the same localities as were visited by cholera in 1832. Those localities are some that are enumerated in my evidence."

John Charles Hall, Esq., M.D., in his evidence complains of the general want of ventilation in those parts of the town occupied by the poorer classes. In another part of his testimony he says—

"I have ever found attacks of low fever the most frequent and the most fatal in the crowded, badly ventilated dwellings of the poor, situate, as they are, in courts surrounded by animal matters in a state of decomposition. The church of East Retford is badly ventilated, and not at all well drained. I think its present dilapidated condition arises in some measure from the want of drainage."

Dr. Hall is the author, among other valuable works, of a very excellent pamphlet on Sanitary Reform, in which many of the evils of the town of Retford are most graphically depicted. I regret that want of space disables me from quoting extensively from his pages, but the book is published at a price which makes it easily accessible, and though written to show the necessity of a Public Health Act, it is not the less valuable now to those places which have not yet availed themselves of the advantages offered by the Legislature. At page 36 the Doctor says—

"In Retford most of the thickly-populated parts of the parish are huddled together *in narrow passages* to which *the rays of the sun are strangers*, or erected in confined rows, to which ventilation and cleanliness are unknown."

William Newton, Esq., Town Clerk, says in his evidence—

"Some common lands which entirely surrounded the town have been enclosed within these few years. On public grounds I think that has been a disadvantage to the town. There is no open space to which the inhabitants can have free access for recreation."

The public *lodging-houses* exert a greater influence on the general health of the town than the inhabitants imagine. In these places cleanliness and good ventilation are most needed and least attended to. They are crowded night after night with herds of miserable and degraded human beings, of both sexes, who lodge indiscriminately, and whose only pleasures, with very few exceptions, consist in sensual gratification and a vagabond life. In the sleeping rooms, all the space that can possibly be obtained is taken up with beds; every crevice that could admit air is stopped; the inmates generally sleep in a state of nudity, the more easily to rid themselves of vermin. Their unclean apparel is thrown over them to eke out the scanty bedding, and because there is no other place on which to lay it. The atmosphere of the bed-rooms some time after the lodgers have retired to rest, is most pestilential, and it is impossible, if these public lodging-houses be left uncontrolled, that they should be other than hotbeds of fever. I have not visited the lodging-houses of any town without finding cases of either endemic or epidemic fever. The disease is formed in these places, and then carried in its incipient state from door to door among the inhabitants of the town.

There are 12 of these lodging-houses for tramps in the district, exclusive of those for railway labourers. Of these there are 5 in East Retford, 6 in Clarborough, and 1 in Ordsall. As a matter of duty I visited, at the first inquiry, some of them, and the following is a summary of the observations made at the time. All about *Atkinson's* lodging-house in Wellington-street there are large accumulations of filth, and I was informed by Mr. Davies and Mr. Flower that they had both had cases of typhus in the house.

There are two lodging-houses in *Sutton's-row*, and I found several cases of fever there. In one of them, a small chamber-height cottage, one room had 2 beds for the accommodation of the tenant, an unmarried man, a woman, and 3 children; total, 5 persons. In the public night-room there were 6 beds containing 14 persons, 10 males and 4 females. One of these beds was occupied by 4 individuals.

Another house, equally small and inconvenient, contained 6 beds, occupied by 11 persons, 8 males and 3 adult females. I saw in this house, in the presence of Dr. Hall and the policeman who accompanied us, what I cannot describe, but which proved, beyond a doubt, that every vestige of decency had been removed from the minds of the inmates. The police, who have frequently to visit these houses, state that the number of inmates varies from 8 to 42 each house per night.

During the recent inquiries I inspected one in the borough, four in the parish of Clarborough, and one in Ordsall.

The mere fact of my having visited some of them on a former occasion, and the probability that they would be again examined, had produced a most salutary effect. In one or two the inmates had not retired to rest, though after the usual hour. In several I could perceive that I was expected. Two had been evidently limewashed within a day or two, and three had got clean linen put on all the beds. In one of the largest all the sheets had been changed the same day. The number of lodgers also in several was so much less than usual as to excite the surprise of the superintendent of police who accompanied me.

These facts are an evidence of the beneficial results that may be expected from the exercise of the powers conferred by the Public Health Act upon an active and efficient Local Board.

Notwithstanding these improvements the inspection showed most deplorable instances of overcrowding, absence of ventilation, uncleanliness of persons and clothing, indecency, degradation, and misery.

In one house in Clarborough there were 2 night rooms, containing 6 beds for the accommodation of 9 individuals, 5 females and 4 males.

In another in the same street, Moorgate, 4 rooms, 10 beds; 28 persons, 13 males and 15 females. These rooms were each about 11 by 11 by 7 feet, affording an average of only 121 cubic feet of space for each person, without any deduction for beds, &c.

Another house at Spittal Hill, in Clarborough, contained 6 rooms, 16 beds, and 26 persons, consisting of 17 males and 9 females. The house is said to accommodate frequently a much greater number of persons than I found there. Several of the rooms are in the roof, and of very small dimensions. I measured one of these, containing 6 men in 3 beds, and found it 9 by 12 by $4\frac{1}{2}$ feet; cubical content, 486 feet. The beams across the room and the beds require a deduction of 134 feet, and the bodies and clothing of the inmates 36 feet, leaving 316 feet, or an average of $52\frac{1}{2}$ cubic feet of breathing-space for each individual. The only opening was a dormer window, about 2 feet square, and close shut. Perspiration was streaming from the bodies of the 6 men, and the odour of the room was indescribable.

The tenant of the house and his wife have both recently had typhus fever, and a child has now the small-pox.

The Vicar of East Retford says—

"There are five lodging-houses in the borough, and others beyond it, chiefly in the parish of Clarborough, with which I am not so well acquainted. I was never called upon to visit any of them late in the evening or during the night, but I should say that the persons who resort to them are of immoral character, generally speaking, and that great immoralities are practised there. I am of opinion that such

places should be subjected to license and inspection, such inspection having reference not only to the number and sanitary state of the occupants, but also as to their social and moral condition. If the Public Health Act would enable the corporation to effect such alterations and improvements in the lodging-houses, its application would in that respect also be beneficial."

Population, number of houses, and rate of increase.—At the census of 1831 the population returns were as follows :—

East Retford	2491
West Retford	593
Clarborough	2106
Ordsall	809
Total	5999

In 1841 the numbers were—

East Retford	2680
West Retford	618
Clarborough	2207
Ordsall	955
Total	6460

The decennial increase was therefore for—

East Retford	7·59 per cent.
West Retford	4·20 ,,
Clarborough	4·80 ,,
Ordsall	18·04 ,,
And for the whole of the four parishes	7·68 ,,

The number of houses and of occupants to each is as follows—

Parish.	Houses in 1831.	Houses in 1841.	Population per House in 1831.	Population per House in 1841.
East Retford . .	546	581	4·56	4·61
West Retford . .	152	159	3·90	3·90
Clarborough . .	507	545	4·15	4·05
Ordsall	205	253	3·94	3·77
Total	1410	1538	..	..
Average . . .	..	..	4·25	4·20

The following is a classification of the annual rateable value of the houses in each of the four parishes to the end of 1848 :—

PARISH.	Total.	£3 and under £4.	£4 and under £5.	£5 and under £6.	£6 and under £7.	£7 and under £8.	£8 and under £9.	£9 and under £10.	£10 and under £15.	£15 and under £20.	£20 and under £25.	£25 and under £30.	£30 and under £40.	£40 and under £50.	£50 and under £60.	£60 and under £70.	£70 and under £80.	£80 and under £90.	£90 and under £100.	£100 and upwards.
East Retford	608	232	45	24	30	25	18	17	52	50	40	18	23	8	7	7	5	3	1	3
West Retford	143	110	4	5	2	2	2	7	4	..	..	..	..	1	..	2	..	..	..	..
Ordsall . . .	261	173	11	12	13	5	6	2	12	11	1	4	3	1	2	2	2	1	..	..
Clarborough	494	352	35	16	5	9	11	8	27	13	5	2	5	5	..	1	..	..	..	..
Total . .	1506	867	95	56	53	41	37	29	98	78	46	24	31	15	9	12	7	4	1	3

The following is a similar classification of the annual rateable value of the houses in the Town of Retford to the end of 1848 :—

PARISH.	Total. . .	£3 and under £4.	£4 and under £5.	£5 and under £6.	£6 and under £7.	£7 and under £8.	£8 and under £9.	£9 and under £10.	£10 and under £15.	£15 and under £20.	£20 and under £25.	£25 and under £30.	£30 and under £40.	£40 and under £50.	£50 and under £60.	£60 and under £70.	£70 and under £80.	£80 and under £90.	£90 and under £100.	£100 and upwards.
East Retford	608	232	45	24	30	25	18	17	52	50	40	18	23	8	7	7	5	3	1	3
West Retford	127	96	3	4	4	2	2	3	6	4	..	..	..	1	..	2	..	..	..	..
Ordsall . . .	133	78	9	11	12	1	4	1	6	3	1	3	2	2	..	..	..	..	..	..
Clarborough	363	271	29	11	3	6	7	4	18	4	5	2	1	2	..	..	..	..	..	..
Total. . .	1231	677	86	50	49	34	31	25	82	61	46	23	26	13	7	9	5	3	1	3

These statistics show that, notwithstanding the crowding in the lodging-houses, the average population per house is lower than in many towns.

Construction of houses and their appurtenances.—Most of the houses in the town are constructed of brick, with tiled roofs, flat tiles for the ground floors, and plaster for the floors of the upper rooms.

The cottages in the district are superior, considered as to construction merely, to those of any town in which I have held an inquiry.

The rents are rather high for a country town. Cottages of two rooms would average upwards of 1*s.* 6*d.* per week and rates.

I have already adverted to the ill-ventilated condition of the neighbourhoods containing a great portion of the small houses. This evil is much aggravated by the improper position and vicious construction of many of the privies.

In several places sleeping-rooms are built over privies. In Sutton's-row 13 houses have only one privy; and 25 houses have no back premises or accommodation.

Mr. Thomas Lawrence complained that there was a privy close at the back of his house, very offensive, and stated that five of his family had had low fever. Mr. Wentworth Harrison also complained of the same privy. I examined the place, and found it to

be within four feet of the houses, but on the property of another landlord.

In Beardsall's-row, leading from Grove-street to Spa Common, I found 2 privies to 11 houses, and 2 others for 6 houses, both under bed-rooms; 4 houses have no accommodation provided; the people have to go across the street.

Diseases and Mortality.—There is a beck or open ditch which divides the parish of Clarborough from East Retford. This was constructed many hundred years since to carry off surface flood-water; it is now a receptacle for the decomposing refuse of a large portion of the town, and quite stagnant. It is said to be at a higher level than the floors of many of the houses, and there have been numerous cases of typhus fever there; low fever is endemic in the neighbourhood.

At Thrumpton in Ordsall, near a filthy, green, stagnant pond, there has been fever. In the same locality is a depôt used by the "muck merchants," producing a most unpleasant effluvium. Mr. Davis stated that there was generally fever in its vicinity.

The history of epidemic disease in Retford would carry us farther back than is necessary for the present inquiry. It appears, however, from the register-book of West Retford that the plague was extremely prevalent in 1558. Between the 22nd of July and the 12th October, 82 persons died thereof. Again in 1664 the town was visited with this dreadful scourge, and between the 20th May and the 10th October 66 persons fell victims. Mr. Piercy is not a medical man, and 21 years since, when his history of the town was published, comparatively little attention had been paid to the external causes of epidemic and contagious disease. The following remarks, therefore, on the pestilence which had at a period so long anterior swept off a portion of the inhabitants, evince more than ordinary penetration:—

"This extensive mortality may, in some measure, be attributed to the low and swampy situation of part of the town, and from the noxious effluvia arising from the stagnant waters—the remains of the frequent floods of the river Idle."

On the breaking out of the cholera in this country in 1832, a large open sewer existed at the end of Sutton's-row, and Dr. Hall's pamphlet, already alluded to, says—

"It was predicted by the medical gentlemen of the town, that should this fearful scourge visit Retford, this ill-drained, ill-ventilated, and densely populated place would prove its advent. At length the fearful reality appeared. On the 19th of July, a labourer residing in this locality was attacked and died. During its five or six weeks' continuance in the town there were 51 cases reported, of which 13 died, and 38 recovered."

In the earlier part of this Report the same locality appears in the list of the Superintendent-Registrar. It is several times alluded

to in the minutes of my inspection of the town, and appears in the following medical evidence as the abode of epidemic and endemic fever.

The evidence of resident medical practitioners is always of importance in these inquiries, and I therefore quote their testimony more at large than that of other witnesses.

William Mee, Esq., the Mayor, says—

"I am a surgeon practising in Retford. I have been a member of the town council ever since the Municipal Reform Act was passed. The borough of East Retford is very little above the level of the river Idle, and, as a necessary consequence, the subsoil of the town is saturated with moisture. There is no artificial deep drainage; in fact there is little or no drainage at all. The floors of houses, and the foundations of buildings are very damp. It is quite impossible to have cellars in the town; and you see moisture rising up the walls. I know that, defective as it is, the drainage is better than it was some years ago. The atmosphere of the town is generally surcharged with moisture, and in the dwellings the heat of the fires will draw the aqueous vapour out of the walls. Fifteen or twenty years ago we were much subject to low fevers, but of late years we have had less of it. I think this decrease of such cases has resulted from greater attention to sanitary arrangements. It is a surprise to me that we have not more disease than we have. I am clearly of opinion that with efficient sanitary arrangements the health of the town would be much better than it is. I may venture to say that strangers coming to the town are very liable to rheumatic attacks, arising, as I apprehend, from the damp state of the place. The inhabitants have become acclimated and are not so liable to these diseases. Still rheumatic affections are not only prevalent but of a very severe character. Patients frequently fall into the chronic state and become cripples. Coughs and affections of the chest are more common than in the neighbouring parishes. At the time the cholera visited the town in 1832 it was chiefly confined to a low dirty part of the town called Sutton's-row. That is a place very likely again to generate disease of a serious character, and it is highly necessary that great improvements and alterations should be effected there. The same remarks apply to Spittal Hill, and Moorgate in the parish of Clarborough, to Thrumpton and South Retford in the parish of Ordsall, and also to parts of the parish of West Retford.

"As mayor of this borough, therefore, and also as a medical practitioner, I am of opinion that the application of the various provisions of the Public Health Act would be highly beneficial to the place; and that we ought also to take in some of the adjacent parishes lying beyond the municipal boundaries; because it would not only render our drainage, &c. more perfect, but be equally advantageous to them."

Dr. Hall says, in his evidence—

"My attention has been for many years past devoted to a careful examination of those causes which tend to increase the bills of mortality, and seriously to affect the health of towns. We have several open ditches of a dangerous kind in Retford. I would draw attention to the one passing close to the house of Mr. Metcalfe, the printer, the stench arising from which in summer is most disgusting. It is impossible that

such stench can exist without being injurious to health. There is another ditch passing from the Gas-house to the river Idle, which emits in hot weather a constant poisonous effluvium; and in that part of it near to Spittal Hill it passes near the windows of several houses in a very densely populated part of the town. I have attended cases of fever there. We have nothing deserving the name of proper drainage. Every grate and gully-hole in the borough is without a trap. We have hardly a cellar in the town. In the worst portions of the town there are frequently scrofulous deposits in the glands of the neck, and also those diseases of the eye which depend upon the same causes. I entirely concur in the remarks which have been made by the mayor, and also in the opinion expressed by him as to the great advantage which the town would derive from the application of the Public Health Act."

William Allison, Esq., surgeon, says—

"I entirely concur in what the mayor and Dr. Hall have said respecting the locality of Retford, and the desirableness of draining it. I reside in Bridge-street, and the ground is so elastic from the excessive moisture in the subsoil that carriages passing shake the house. This is exemplified in the rattle of the windows, and of any glasses in contact upon the table. The atmosphere of the town, and for a short distance, is frequently filled with a dense fog in the evenings, whilst the adjacent district is clear. The usual diseases are such as appear in all damp, marshy situations, including rheumatism, glandular affections, the milder typhus, membraneous inflammations, bronchocele or full throat, English cholera and diarrhœa, malignant typhus, asthma, crysipelas, and ague, intermittent and remittent. When the tone and energy of a system are reduced by illness of any kind, there is frequently a great want of reaction; the party *continues* an unusual length of time in a state of debility or enervation. The men become dejected, and the women hysterical. I may further remark that when persons have been suffering long from low fever, or from any other disease which has placed them under depressed physical circumstances, I find that an attack of active disease from which a patient in another locality would easily recover, often becomes quickly fatal. The sanitary condition of the locality is capable of very great improvement, and as the Public Health Act would give the Corporation power to construct the necessary works, I think its application would be a great boon to the inhabitants."

Thomas Phillips Davies, Esq., the medical officer of the Union for East Retford, West Retford, and Ordsall, says, in his evidence—

"My official duties bring me into frequent contact with the sick poor. I think the lower classes generally suffer from debility. To a great extent this may be from the want of proper food and clothing, but to a great extent also, I am sure, from the unhealthy condition of the places where they live. I believe sore throats are prevalent here more than in other places; I suffer from it myself, but when I go from home I am always better. I should think these complaints are more prevalent in spring and autumn, but I have observed them in all seasons of the year. There is an intimate connexion between disease and filth.

"There is no medical assistance given gratuitously except that which is afforded privately by the medical men of the town. I am the medical

officer of four benefit friendly societies. In all of them there is a medical examination before admission. The contribution is from 1*s.* 6*d.* to 2*s.* per month. If the health of the town were improved these societies would be brought into a more prosperous state, and might either reduce their contributions or increase their payments to sick members and for funerals;—so that friendly societies have a great interest in sanitary improvements. To the extent to which the health of the town would be raised by the construction of sanitary works and the amount of sickness, widowhood, and orphanage reduced, the poor-rates would also be reduced. I know Wright's property in and about the Mermaid Yard in West Retford. Some of the houses there are unfit for human dwellings, and the place is now, and has been for some time, the seat of fever. The whole of Tenter Flat or Back-lane is in a bad state,—incompatible with the enjoyment of good health.

"The parish of Ordsall generally requires sanitary measures more than East Retford;—more, certainly, than West Retford. I have had much more to do there as Poor-law surgeon than in East Retford, considering the comparative populations of the two. For the last twelve months it has not been free from fever. There is a row of three houses in the village of Ordsall, called Stead's Houses, in which I think all the inmates have had fever. Some are ill now. The houses are completely encircled with ashes, privy soil, and other offensive matter. There have been some cases of active and virulent fever. In one I am not sure yet that the patient will recover, and the nurse in attendance has carried the disease to her own house, and is now ill. In Thrumpton, which is in the same parish, I have also had cases of fever, and one death. I attribute these fevers to the low situation and the filthy condition of the neighbourhood. I think it is very desirable that these parishes should be consolidated into one district with East Retford, for all the purposes of the Public Health Act."

Samuel Marshall, Esq. says—

"I am medical officer of the Union for the parish of Clarborough, and in general practice in the town of Retford. I have heard the evidence of Mr. Davies, and quite agree with him as to East Retford, West Retford, and Ordsall. I can speak more particularly as to Ordsall, because I was Union surgeon for that parish myself for some years. The drainage of Moorgate and Spittal Hill, in Clarborough, is very defective, and to that I ascribe much of the existing disease. Fever of a low type is prevalent.

"In Bollam-lane the houses are very low, ill-ventilated, owing to their having no back-doors, with a stagnant drain in front, filled with all kinds of filth, privy soil, and refuse from the houses. The floors are very little above the level of the ditch. There is fever in the neighbourhood at the present time, and has been some of a virulent nature. In the George Inn-yard, in Moorgate, there are piggeries, manure-heaps, and foul privies, but no drainage. The houses have no back-doors. I am attending one case of typhus fever there now. I have had other cases in the same place; in fact there is always some one ill in the yard.

"The village of Clarborough requires attention more than even the town. There is an open stagnant drain nearly the whole length of the village, being almost on a level with the doors of some of the houses;

and there have been several fatal cases of typhus there within a short period. I am decidedly of opinion that the consolidation of all these parishes into one district for sanitary purposes would be a highly beneficial arrangement."

It is to a great extent owing to the geniality of the climate that the Retford registration district is the most healthy in the county of Nottingham. How intensely active then must be those causes which depress the vitality of the town population, when we find that the annual mortality in the borough of East Retford is 22 in every 1000, while in the whole registration district of Retford it is only 17 in 1000! The vital statistics of many of our middle class and smaller towns are concealed by the healthy condition of the country parishes with which they are connected; thus the inhabitants of the town of Retford are generally fain to believe that they live in a most healthy place;—but by analysing the mortuary registers the illusion is dispelled, and it is found that they have taken credit for two years longer duration of life to every individual born than is actually their due, and at the same time have unwittingly deprived the country parishes in the Union of two years of *their* existence.

The true state of the case is, then, that the whole population of such parishes as Eaton, Babworth, Grove, &c., live on the average four years longer than the inhabitants of the town of Retford.

The infantile mortality of a place has been long considered the best indication of its sanitary condition, because children are not affected by migration, hard labour, injurious trade operations, or the numerous accidental causes which tend to increase the mortality of the adult population as compared with that of another and more healthy locality.

The mortality of the whole registration district of Retford, among infants under one year, is 21·2 per cent. of the total number of deaths. In the borough of East Retford it is 25·8 per cent. Under five years the registration district is 33·3 per cent., but in the borough 41·4. Under 15 years, the registration district 40·8 per cent., and in the borough 43·1 per cent. Under 20 years the registration district 44·6 per cent., but in the borough 46·6 per cent.

No doubt therefore can remain in the mind of any reasonable person that there is a great excess of sickness and mortality in the town of Retford, and that such excess arises from preventible causes.

It is from a wish to avoid any further extension of this part of my report, that I refrain from details and estimates of the pecuniary expense in the cost of sickness, funerals, lost labour, charges on benefit and charitable societies, and increased poor-rates, for medical and casual relief, and for the support of widows and orphans. I have very little hesitation however in saying that

the sum total would more than pay all the charges for all the works necessary to improve the sanitary condition of the district.

State of the Burial-grounds.—At the opening of the former inquiry, in March, the first complaint made was respecting the crowded condition of the East Retford churchyard. I examined it, and found numerous fragments of bones exposed on the surface, even where graves appeared not to have been opened for some time.

Dr. Hall in his evidence says—

"The churchyard is so overcrowded as to be altogether unfit for the reception of the dead. An examination of that burial-ground, more particularly after a shower of rain, must convince any one that it ought immediately to be closed, and some other piece of ground selected at a greater distance from the abodes of the living. I have frequently seen an iron bar thrust down into the coffins and remains of the dead, in order to find a place where a grave could be opened. I have also frequently seen graves opened, and the number of bones exposed then is much greater than you saw to-day."

In consequence of this evidence, and of what I had witnessed during the inspection, I requested the attendance of Mr. John Tootle, sexton, and examined him, when he gave the following evidence:—

"I am sexton of the parish of East Retford. Have held that office more than four years. The soil of the churchyard is from 4 to 6 feet thick. We cannot dig a grave more than 6 feet, or in some parts of the churchyard 5½ feet deep, in consequence of the water. When we get to water we generally leave off, and put some soil in again to stop it. We have about 40 interments in a year on the average.* I should think, though I have not measured, that the area of the church and churchyard would be about an acre.† I have dug two or three graves without throwing out any bones. In some graves the quantity of bones thrown out is small; in others from a peck to a peck and a-half. I invariably use an iron rod, which I push down to the coffins and bodies to ascertain where I can dig a grave. I am compelled to do this because the hillocks have been removed, and I cannot always tell where bodies have been interred. It is true that after a shower of rain small bones are exposed, but I do my best to cover them. The old sexton had been in his office 20 years or more, and when I was appointed I asked him if the ground was full, and he told me that there was as much room as ever there was. I have found it so. I have been surprised to find it as open as it is. I do not open the ground at the back of the church, where persons who died of cholera were buried. It was in the front, opposite Mr. Clarke's house, where I opened two or three graves without finding any bones. I am not aware that any person could at this moment, if it were light, go into

* Mr. Newton, the town-clerk, afterwards informed me that the annual average for the years 1846, 7, and 8, was 50¼ interments.

† This was a mistake evidently, and therefore I caused an accurate survey to be made, from which it appeared that the whole area, including the church, the cholera-ground, walks, burial-ground, and fence-walls was 2 roods and 33½ perches.

the churchyard and find more than a hundred bones scattered over the surface. A person might perhaps turn them out with a stick. Nothing has been done to drain the churchyard.*

"There have been three bodies buried in the church itself since I became sexton. I know that both the floors and walls of the church are damp. I never smelt any bad smells, either in the church, the churchyard, or the graves. I thought much at the first about thrusting in the iron rod, but in time I got used to it. The rod is about 4 feet 6 inches long, and about an inch or an inch and a-half in diameter. I push it down the full length. I do not fill up the holes; they close themselves."

I thought it right also to examine the vicar on this subject; he says—

"A dry ditch has been dug around the walls of the church to keep it from being damp. The church floor is on a level with the walks outside. With respect to the dampness of the church floor I think it would be an advantage if a system of public drainage were constructed, and the floor could be dried. I have occasionally, not often, seen fragments of bone on the surface, and have told the sexton to bury them.

"Several individuals from East Retford have been buried at St. Saviour's chapel in the parish of Clarborough. The Wesleyans have now a burial-ground. These, in my opinion, render it less necessary to close, to any extent, the parish churchyard. Persons commonly wish to be buried where their relatives are laid, and even if they had the option would prefer being buried in the old churchyard.

"I should think it would be desirable if there could be an additional consecrated burial-ground outside the town, so that the inhabitants could have the option of being buried there, though I am of opinion that not many would avail themselves of it."

Mr. Alderman Watson having complained of the crowded state of the West Retford churchyard, I examined it in the course of my inspection of that parish. I was surprised to find that while the south side of the church appeared to be completely full, there seemed to be scarcely any graves on the north side. On inquiring the reason of this, I was told that the fees charged by the Rector for interments on the north side of the church were at least double the charges for the south side. No one present could inform me, however, on what authority the Rector made this difference. I sent therefore for Mr. William Burrows, the parish clerk, who gave evidence to the following effect:—

"I am parish clerk and sexton of West Retford. I have had the office 22 years. The soil to a depth of 4 feet is made ground; below that it is sand rock. The graves are quite dry in every part of the churchyard. I generally dig graves to the depth of 5 feet. The interments average from 17 to 18 per annum. I do not know the area of

* I was afterwards informed that two drains were made by the churchwardens in 1841. They are from 4 feet to 4 feet 6 inches deep.

the churchyard.* Not any part of the south side of the churchyard is fit to dig a grave in. I have fetched the churchwarden frequently to look at the state it is in. I am, however, obliged to dig graves there, and frequently turn out half a dozen skulls from one grave, and of course all the other bones belonging to those skulls. I never dig a grave on the south side without casting out bones, except it be for a little child, and not more than a foot or two deep. I have dug up skulls with the hair on; it appeared quite fresh. As a general rule I do not think I disturb the remains of bodies under 15 or 16 years after interment. I cover the skulls and bones with mould until the additional interment has taken place, and then put them in again when I fill up the grave. Interments are allowed in the church; I should think, however, that it is three years since the last body was interred there. I cannot say that I have perceived any unpleasant smell on opening the church, but we generally have the windows open during the week-days. The south side of the churchyard has been crowded ever since I have had the office, but has been getting gradually worse. I shudder at the thought of digging graves and turning up skulls and bones in such numbers, and often leave the place and pay some one to finish it for me. There is plenty of room on the north side of the churchyard. The interments on that side do not average one a-year. The whole of the fees for an interment on the south side of the churchyard amount to 5*s.* 6*d.* Non-parishioners are charged 28*s.* for an interment in a common grave: all the circumstances in the two cases being the same except as to the previous residence of the deceased person. Very few bodies except those of parishioners are buried on the south side. On the north side parishioners are charged 13*s.* 6*d.*, and non-parishioners sometimes 21*s.* and sometimes 42*s.* Two guineas is considered to be the charge, but sometimes the rector agrees to take less. I do not know why there is any difference of charge between one side of the churchyard and the other.

"I was clerk and sexton several years before the incumbency of the present rector. There was the same difference in the amount of fees between the two sides of the churchyard at the time when I was appointed."

The fact of the churchyard being nearly vacant on one side of the church, and on the other in the awful condition described by the clerk, appeared so strange, that I requested the Rev. Henry Dickonson, the rector of West Retford, to attend the inquiry and give some explanation. The following is his statement:—

"I believe that the arrangement for a difference in the amount of fees for interments on the north and south sides of the church of West Retford, was first made by my immediate predecessor in the incumbency. His view was that although the parishioners had a right

* I caused the church-yard to be measured, and found it to contain half an acre of land, including the church and fences, as follows:—

Site of the church	398 sq. yds.
South side of the church	1058 ,,
North side of do.	1000 ,,
	2456 ,,

of interment in the parish churchyard, the rector had to decide as to the site of the grave. I think that view correct; but the condition of the churchyard is much altered since that regulation was adopted many years ago. The ground is now more full of bodies, and I have therefore reduced the fees to a much smaller sum than was originally taken for interments on the north side of the church."

The churchyard of Ordsall is about an acre in extent. It is considerably elevated, and the graves are dry. The average depth is 5 feet. There are about 20 funerals per annum.

The Rev. Thomas King, rector of Ordsall, says—

"There are no fees payable for funerals by parishioners. The matter was so arranged when the tithes were commuted. I make a small charge for the interment of non-parishioners."

This burial-ground appears to be quite free from objection.

The parish-church burial-ground at Clarborough is free and open. Not one-third of the area appears yet to have been used for interments. I do not see that any improvement could be made in it.

St. Saviour's Chapel, in the hamlet of Moorgate, has not been erected many years, and therefore the burial-ground attached to it has not yet had time to become crowded. I believe, however, there is water in the graves.

The burial-grounds connected with the several dissenting chapels are of small area, and are none of them in an objectionable condition.

Land Drainage.—I have already given the Board the substance of the remarks which, on the opening of the second inquiry, I felt it my duty to make in order to remove misapprehension from the minds of the farmers, and to convince them that the land ought to be included in the district to facilitate its efficient and economical drainage. My remaining observations under this head will be as brief as is compatible with its importance.

The several becks in the bottom of the valley of the Idle, and on each side of it, running through the town, have been originally formed for draining the land, but, being now used as sewers for the drainage of buildings, they have become great nuisances. On the sand-rock and the deep gravel west of the Idle, the subsoil and geological strata are so absorbent as not to require artificial drainage. On the east side of the river, however, where the subsoil is clay, and also in some parts of the valley of the Idle, the thorough drainage of the land would not only be of great advantage to the farmer, but also to the inhabitants of the town; who suffer, according to the medical testimony, from the great humidity of the atmosphere. There are many hundreds of acres between the town of Retford and the village of Clarborough, in a very defective state as to drainage. I saw many pasture fields growing large crops of rushes, and some fallows perfectly baked.

Mr. Francis White, who has an intimate knowledge of the district, and has had great experience, says:—

"I am a tillage merchant, land valuer, and farmer. Both deep and shallow drains have been laid down. Common tiles and soles have been used for 20 years and upwards. Thorough drainage is now practised, and pipes are beginning to be used. In every parish the depths and distances vary with the nature of the soil and the caprice of the farmer. The depths from 2 to 4 feet. The distances from 7 to 10 yards; the price per acre is about 5*l*. Besides the improvement in the quantity of the produce, an important alteration takes place in the nature of the subsoil, which in clay land will be changed into a fertile loam; the depth of fertile soil gradually increasing with time. The surface of the ground being dried, there is of course much less evaporation, and the atmosphere is less liable to fogs and damp. It is therefore very important in its bearing on the health of the inhabitants of Retford, that the suburban land should be thoroughly drained. There is less fog here than formerly, but the drainage is still capable of great improvement, and such drainage would tend materially to raise the sanitary condition of the town."

Sewerage and House Drainage.—At the opening of the East Retford inquiry, Dr. Hall complained of a drain running from the market-place to the river, especially near the house of Mr. Metcalfe; also of the ditch dividing East Retford from Moorgate; also that the grate and gully-holes throughout the town emitted offensive smells; and, generally, of the absence of proper drainage in the town.

Mr. Wm. Agar, druggist, complained of stagnant drainage on his premises in Bridge-street.

Mr. Samuel F. Flower, surgeon, complained of the want of drainage in Carrol-gate; that there is no outlet, and that the refuse runs into a cesspool, which has to be pumped up into the street.

Mr. Alderman Gylby complained of an obstructed drain on his own premises, and that he cannot get rid of the refuse under existing arrangements.

Councillor John Hudson complained of the drainage of Sutton's Row; also of a drain flowing from the commons of East Retford and passing under the river.

Mr. George Chapman, surgeon, complained of the drainage of Moorgate, in the parish of Clarborough; also of the drainage of Thrumpton, in the parish of Ordsall.

All these places I visited during the inspection, and found them in the condition described by the complainants.

In the beck behind the grammar-school, was a large quantity of flocculent and fibrous matter, giving off sulphuretted hydrogen gas in great abundance.

Moorgate, in Clarborough.—At Mr. Henry Wright's property there is very bad drainage, with foul stench. The same want of drainage continues all the way up the street.

I found many trees and fences covered with moss—a sure indication of great dampness in the atmosphere, caused by defective drainage.

In Bowman's garden is seen the drain from the market-place. It was all stagnant. Mr. John Mee has arched it over through his garden, at a great expense, but above is a filthy receptacle of dead animals, and of all kinds of nuisance. It is called King's Goit.

At Mr. Agar's in Bridge-street, there is a cavity under the shop floor called a *pantry*. The bottom is reached by descending two steps, and yet this miserable pantry is frequently full of water.

On the South Road is a row of superior houses belonging to Alderman Watson, who stated that steam and hot water found their way into the cellars from the coach manufactory. I examined one of the cellars, and found that there had been 18 inches of water. It had passed away, and left a quantity of mud.

The cellar of Mr. Davies, surgeon, in Carrol-gate, was about half a yard deep in water; he stated that it had been in that condition two years or more.

In West-street there is stagnant drainage, aggravated by pig and slaughter-house refuse, &c.

Beardsall's yard.—A drain on the surface and a cesspool overflowing. The stench in an adjoining house is intolerable.

At Colton's property in Carrol-gate there *was* a drain opening into the street from a cesspool. The refuse *was* pumped once a fortnight, and flowed along the surface of the public highway; but became so offensive that the Corporation undertook the expense of sinking a dry or dead well, and at present it percolates away.

The low land in the parish of West Retford requires better drainage. In the inspection of that parish, on the 5th instant, I found a large pool of offensive, stagnant fluid, at the bottom of the Waggon and Horses yard. The odour from it was almost overpowering. The drainage of all the court-yards in West Retford is bad, and house drainage is at present impossible.

The drainage of South Retford, in the parish of Ordsall, and also of the village of Ordsall, is as vicious as anything in the whole district.

In Brown's yard, near the windmill, the refuse from some houses has no way of escape, and accumulates under a high wall, forming an evaporating surface of filthy, noxious mud, about 20 yards long and 2 feet wide.

At Thrumpton, which is a locality mentioned in the list of the Superintendent Registrar, there are several stagnant ponds, with an abominable stench.

In the village of Ordsall, at the paper-mills, on both sides of the road leading to Retford, are ponds into which is constantly poured the filth washed from the dirty rags. It is stored for manure, and

removed once or twice a year. Sulphuretted hydrogen gas was escaping from it in large quantities, with a powerful effluvium. On my speaking to Mr. Nelson, the proprietor, he said that they frequently mixed chloride of lime with it as a deodoriser, and he would see that some was applied.

In Mr. John Cook's farm-yard is an undrained accumulation of offensive fluid, about 14 yards long, 6 yards wide, and 2 feet deep. Foul gases were being given off from the surface in great abundance.

There are heaps of manure of various kinds on the public roads, and in gardens and court-yards, close to the doors and windows of the houses, in front and at the back, and even within a few feet of the wells, and the liquid drains continually away along the surface until the roads are quite discoloured in many places.

Mr. William James Hudson says :—

"There are some piggeries and a stable, with no drainage, adjoining my house in Wright Wilson Street, in Ordsall. They are a serious injury to me. The drainage of South Retford is generally very bad, and the smoke from the chimney at the coach factory a great nuisance. The existing local authorities are utterly inadequate to remedy the evils found in many parts of the parish. I think the application of the Public Health Act would be highly beneficial."

Mr. John Lane said he fully concurred in that opinion, and that he had similar grounds of complaint to those presented by Mr. Hudson.

Mill Close, in the parish of Clarborough, was complained of. There is an inefficient and foul drain runs into it from the back of some houses adjoining.

Several persons complained that the drainage of the Union-workhouse, which had for some time past, until recently, flowed into the canal, had been stopped by the company, and that there was now a great accumulation of filthy refuse in a ditch on the side of the road.

These and many other places I examined during the inspection of the parish of Clarborough.

The drainage from the workhouse passes along a covered drain constructed on the side of the road for some distance, and then by an open ditch to the house occupied by Mr. John Lawton at the malt-house, near the canal, where it did enter a covered drain and so pass into the canal. That drain has been stopped by the canal company, and the liquid refuse is forced back in the open ditch for a considerable distance, and is likely to be very injurious to the health of Lawton's family. It is not my province, however, to enter into the dispute between the parties as to an existing right of drainage.

In the village of Clarborough there are very numerous filthy side ditches and open drains, nearly all in a stagnant condition, fully confirming the evidence of the medical witnesses, that it is

even in a worse sanitary condition, as to drainage, than the town of Retford. One of these ditches lies against the end wall, and another passes in front, of a house occupied by Charles Dunk.

Mr. John Gurnell complained to me on the spot that the ditches on both sides of the road carry the refuse of the greater part of the village down to his house.

Mr. Thomas Buck, farmer, said he had suffered much in his health from the stagnant filth in these ditches. The day previously he could not stay in the house. One of these places, perhaps 150 yards long and 2 feet wide, was from 8 to 9 inches deep in black fœtid mud. When disturbed the stench was horrible.

The mills at East Retford and Bollam, by damming up the waters of the Idle, are a great impediment to any drainage of the site of the town, and entirely preclude the possibility of any deep drainage of buildings except by means of artificial power. The Retford mills are the property of the Corporation.

Mr. Newton, the town clerk, says in his evidence :—

"It has always been admitted by the Town Council that, irrespective of pecuniary considerations, it would be an improvement to the town to remove the mills at East Retford, and also the one at Bollam, belonging to Mr. Michael Thorold. The Bollam mill stops the drainage of the town during the whole day; we have only an outfall during the night. The drains, such as they are, have been constructed out of the corporation funds."

House drainage cannot be said to exist, either in the borough or any of the parishes forming the subject of the present Report. There is scarcely an underground cellar in the whole town of Retford.

Mr. F. White, one of the Town Council, concludes his evidence in the following words :—

"The drainage of the town is the most essential thing that can possibly be effected; and, generally, I am sure that the whole district will be greatly benefited by the application of the various provisions of the Public Health Act."

Present Water Supply.—There is no water company in Retford, nor any public supply, except by three pumps. The pump in the market-place gives good water, and the great distance to which the inhabitants carry it for food is a measure of the deprivation they at present endure, and also of the importance of giving them a better supply. A great portion of the well-water in the southern part of the town is, when fresh drawn from the pump, nearly of the colour of malt liquor. The well-water of the district generally is so bad in quality, as to be quite unfit for drinking or food. There are pumps of water in most court-yards but, except among the opulent classes, there are no pumps in the houses. Occasionally the supply of a pump-well falling off

the owner will sink his well deeper; his neighbour does the same, and so they go on, one against the other continually.

The Town Clerk has furnished me with the following statement:—

"The present water supply is chiefly by private wells and pumps. There are three public pumps. One is a good, deep, artesian well, but the water is hard. The second is not so good, because the instruments used in boring broke before it had reached a sufficient depth. The third has its supply from the Idle. The river water is soft and good, and is used by persons living in its vicinity. After rain, however, it becomes discoloured with earthy particles. The drains from Thrumpton fall into the river above the town; but if the proposed boundaries be adopted that would be prevented.

"The cost of sinking and boring a good well in the town would amount to from 30*l.* to 35*l.*, and the lead pump 10*l.*, with wood case complete. I have heard it reported that the late Mr. Kirke's well cost 100*l.* Wells only sunk into the gravel, about 10 feet deep, cost only 15*l.*, including pump. Such water is of very bad quality. Repairs would average 5*s.* per annum. In some places there are several cottages to one pump. The sergeant-at-mace shall obtain you an account of the number of pumps, and also the number of butts and cisterns for containing rain-water. A water tub, with tap, will not cost less tha 21*s.* The cost of a rain-water cistern, 6 feet cube, brick and cemented, 13 inches thick, is about 9*l.* A water tub, with repairs, painting, &c., would last 12 to 15 years. I cannot say what would be the cost of buckets and cans for conveying the water from the pump to the house, but I should take not less than 1*s.* per annum. In addition to this there would be the value of the time spent in carrying.

"The present means of obtaining water in the district are very inadequate."

From the returns since obtained, it appears that in the town of Retford, exclusive of the villages of West Retford, Clarborough, and Ordsall, there are 300 pumps for wells; 82 pumps for rain-water tanks; 82 rain-water tanks; 203 water tubs, containing from 20 gallons to 100 gallons. The population of the town in 1847 was 5900, and the number of houses 1404. The following is therefore a gross approximative estimate of the present cost of obtaining a deficient supply of water, far from being generally good:—

300 pumps and wells 15*l.*	£4500
82 pumps and tanks 15*l.*	1230
82 rain-water tanks 9*l.*	738
203 water tubs 21*s.*	213
	6681

	£.	*s.*	*d.*
Annual interest on 6681*l.*	334	1	0
Annual repairs of 382 pumps, &c., at 5*s.* .	95	10	0
Annual depreciation and repairs of 203 water tubs at 3*s.*	30	9	0
1404 cans, and repairs, per annum 1*s.* .	70	4	0
Carrying water at only 1*d.* per week per house, 1404 houses at 4*s.* 4*d.* . . .	304	4	0
	834	8	0

Equal to about 11*s.* 10½*d.* per annum per house, or 2¾*d.* per week.

Condition of the Roads, Surface Cleansing, and Public Nuisances.—The public highways in the borough of East Retford are kept in excellent repair, and also cleansed and watered by the corporation. No rates are levied for such purposes. There are private roads in a bad condition. In West Retford, with few exceptions, the public roads are good; but in South Retford, in the parish of Ordsall, there are streets newly formed, unpaved, undrained, and miry.

The public highways, in the same part of the town, appear to have been much injured during the construction of the railways.

The surveyors of the highways ought to have called upon the railway companies to make good such damage. Some of the roads are weak, elastic, and foul. Thrumpton Lane is in an indictable state at the present moment.

Many of the roads in the parish of Clarborough are in a very weak and bad condition. I would name, for instance, Well-house Lane, where there is scarcely any depth of metal; the surface is covered with mire, and filled with ruts. There is an open deep ditch on each side, causing a sacrifice of at least two square yards of land in every yard run, and yet there is no separate path for foot-passengers. There can be no worse economy in road management than that which denies them a firm, strong surface of good material, and, at the same time, permanently sacrifices valuable land in keeping open dangerous and filthy side-ditches.

The extent of public highways is—East Retford 2¾ miles, West Retford 4¼ miles, Ordsall 9 miles, and Clarborough 24 miles.

In the villages very little attention appears to be paid to the roads, and they are consequently capable of great improvement, in form, durability, economy, and ease of transit.

In all the court-yards, many of the private roads, some of the streets outside the town, and the country villages especially, the scavenger is much wanted.

The chimney of the coach factory was complained of by several persons as a nuisance.

The large accumulations of manure, especially in the village of Ordsall, are great nuisances, and highly prejudicial to health.

Present Removal of Refuse.—Above all things the surveyor ought to prevent the storing of great heaps of manure on the highways. It ought to be taken into the fields and applied to the land before its fertilizing properties have escaped into the air, or been drained away. As to the present and prospective modes of its removal, and its comparative value, they are clearly stated in the following evidence of Mr. F. White:—

"Artificial manures are used universally upon the sand district. Bones, rape-cake, and guano are much prized. They are beginning to be much more used on the clay land. Collected manures from the town are still in demand, but not so much as they were, because the labour of leading where the distance is a mile, is as 20*s.* to 2*s.* 6*d.* when compared with bones. Some of the principal farmers have got tanks, and are using liquid manures, but only on their paddocks, and not as general tillage. I know of no physical obstacle to the collection of the drainage of this district, and its distribution for agricultural purposes. I have no doubt of its fertilizing properties; and if it can be distributed at a price that will pay the farmer, it may be of great advantage both to him and the inhabitants of the town. The price paid to the occupants of the houses for soil and ashes is 3*s.* 6*d.* to 4*s.* 6*d.* per load.

"The present mode of removing the town refuse is an expensive, and, as far as the town is concerned, an inefficient one, because the offensive smells are for some time very much increased."

Lighting, &c.—There are gas works in the town, and the streets are well lighted. The works were constructed nearly 20 years since by one individual, but have been much extended, and are now the property of a private company. The concern is registered under the General Joint Stock Companies Act, but not enrolled.

The capital consists of 600 shares of 5*l.* each, making 3000*l.* The dividend is 7½ per cent.

Gas is consumed generally in public-houses and sale-shops, and in some private dwellings. The cost of lighting and watching within the borough is defrayed by the corporation. Beyond the borough there is no watching except by the county constabulary. The Lighting and Watching Act is not in force in either West Retford, Ordsall, or Clarborough. The price of gas in 1834 was 15*s.* per 1000 cubic feet. It is now 6*s.* 8*d.* The cost of gas for the public lamps is 3*l.* 3*s.* per annum.

Fires, and means of extinguishing them.—The corporation of East Retford has three fire engines, and there is one in West Retford. There is no staff of firemen. The owner of every house is bound to provide a leathern bucket, and the occupier a drag. It is the duty of the court lect to see that these articles are kept, and a fine is the consequence of neglect. The corporation is the lord of the manor.

The buckets cost about 21*s.* They will last many years. The drag will cost from 2*s.* 6*d.* to 3*s.* Fires are not frequent in the town.

It seems almost superfluous to say, after the evidence, that the application of the provisions of the Public Health Act will be highly beneficial to the borough and the three parishes of West Retford, Ordsall, and Clarborough. But the beneficial operation of the Act depends on their being consolidated into one district for all the purposes of the Act. They all go to form the town of Retford, and in its sanitary improvement it must be treated as a whole. Mr. Newton, the town clerk, puts this in forcible terms in the conclusion of his evidence. He says :—

"For the various improvements necessary, for the removal of existing evils, and for the general benefit of the borough, I am of opinion that the application of the Public Health Act will be a great boon. I think also that the adjacent parishes should be included in the district.

"They would be benefited to an equal extent with ourselves, and our works and improvements cannot be efficiently carried out without theirs being effected at the same time."

REMEDIES.

Improved Water Supply.—It has been already shown that there is no public water supply either in the borough of East Retford, or the parishes of West Retford, Ordsall, and Clarborough: that the inhabitants obtain water from the river, and from pumps and wells, generally outside the buildings, and also store up rain-water in butts and cisterns; and that these modes unitedly fail to comply with the full and fair meaning of the word "PROPER," used in the Public Health Act, to indicate the character of the supplies to be given. The rain water caught in butts and cisterns is precarious in quantity; that afforded by the river is rarely without impurities in mechanical suspension; the pump and well water contains, *occasionally,* an admixture of animal or vegetable substances, and almost always holds in chemical solution some of the mineral matters existing in the subsoil and geological strata of the district.

The importance of a proper supply of water in any sanitary system cannot be too strongly stated. Without this, drains and other sanitary works would be worse than useless; the evils they were intended to remove would be aggravated.

Water is the agent which, in obedience to the simple law of gravitation, is able to carry away, more cheaply and effectually than any other, all those substances which, if allowed to remain in and around human habitations, produce many of the grievous and fatal diseases, for the very existence of which man is responsible, but which are often, more poetically than truly, denominated, "the ills that flesh is heir to."

Water is one of the first necessaries of life. Man requires it constantly. He cannot live without drinking it to quench his thirst, and it enters largely into most of the articles of his food. A water supply entitled to the word "PROPER," must therefore be within reach whenever it is required; namely, it must be constantly on, with a tap in each house, and at such a pressure as will carry it to the uppermost story of the highest dwelling within the district. And it must be pure.

Besides street and house-drainage, the removal of night-soil and other refuse, public cleansing of the surface of streets and courts, and domestic and culinary purposes, there are other collateral objects, such as extinguishing fires, &c., for which an abundant supply of water is necessary.

For all these it is now established that not less than 25 gallons per day for each individual of the population will be sufficient.

The number of the inhabitants of the town is now 6000, and the daily quantity therefore required is 150,000 gallons, or 24,069 cubic feet.

The water of the river Idle is soft, and is stated by Dr. Hall to be very suitable for the use of the town. The marl and gypsum land-drainage water would be hard.

I have, however, examined the neighbouring high lands, but without finding any collecting-ground of sufficient area and altitude to supply the town with the requisite quantity by its own natural pressure, and am compelled therefore to resort to steam power, but have less reluctance in doing this because such power will also be necessary for the deep drainage of the site of the town, and therefore the working expenses will be only slightly increased.

The pumping station for the drainage must be as nearly as possible in the centre of the town, so that a system of converging drains may have a uniform inclination from the extremities. The site of the old Grammar School is sufficiently central, and the land is low, and near the beck which divides the parish of Clarborough from East Retford. This would be an advantage in sudden storms, when a large quantity of drainage must be raised a short lift as rapidly as possible. The site would be also convenient for pumping water, and, there being only one station, the working expenses would be economised.

The Canal Company obtain their water for supplying the canal, from the river Idle, about half a mile above the village of Ordsall, and nearly a mile and a half from the centre of Retford, so that the water is obtained entirely free from pollution. It is conducted by an open feeder to the canal, at a point near the gas works. The distance from thence to the place I have selected for the pumping station is only about 400 yards, and, on inquiry, I was informed that an arrangement could probably be made with the canal company for the insertion of a conduit-pipe

of about 7 inches diameter to convey the necessary quantity of water to the well.

The highest land in the immediate neighbourhood of the town is near the Union workhouse at the top of Spittal Hill. A small field there, at the back of the Retford Toll-bar house, is well adapted for filter-beds and a supply reservoir. It is only about 550 yards from the pumping station. From an eye survey at this point I have little doubt that the water would reach the highest story of every house, with the exception of perhaps half a dozen at the top of Spittal Hill, and they would have a good supply in the lower rooms.* From this reservoir, then, a constant supply of water could be conveyed by pipes, and delivered, pure and well aërated, in every dwelling in the town.

On this scanty data, I have made an estimate of the cost of construction, &c., which must be taken as the nearest approximation attainable under the circumstances; it is as follows:—

	£.	*s.*	*d.*
Land	40	0	0
Pipe to well	190	0	0
Well and engine-house	300	0	0
Steam power	840	0	0
Pipe to filter-beds	302	10	0
Filters and store reservoir	400	0	0
Street mains	2854	0	0
House services	1230	0	0
Fire-plugs	87	10	0
	6244	0	0
Wear and tear, and depreciation, &c.	546	0	0
	£6790	0	0

There are 1230 houses in the town, and the sum required to pay off the cost of works, with interest, by annual instalments, and also the accruing expenses for management, would be 398*l.* 14*s.* 4*d.*, equal to 6*s.* 6*d.* per annum per house, or 1½*d.* per week.

I attempted to apportion this charge at a per-centage on the annual rateable value of the houses, but found I could not do it equitably on account of the unequal manner of rating the property in one parish as compared with another. It would be unfair, however, to charge a cottager as much for water as the occupant of a large mansion, and therefore I leave the actual sums for the consideration of the Local Board of Health; who will know the different circumstances of the consumers. I say, however, with the greatest confidence that a cottager need not be called upon to

* According to the section taken by Mr. Allen at my request, a reservoir, 10 feet deep there, would give 40 feet 8 inches pressure at the end of Grove-street, in the Marketplace.

pay more than 1½*d.* per week for this indispensable requisite to his health and comfort.

Improved Drainage of the site of the Town.—While considering the best mode of supplying the town with water, I have already indicated the means to be adopted for its effectual drainage. A few facts respecting the outlets and the levels will prove the impossibility of natural drainage. It has already appeared that the waters of the Idle are dammed up for mill-power during the day, and that there is no outfall but in the night. But the inadequacy of the fall is of itself a sufficient obstruction. The sections taken for this inquiry show that from the outfall at the northern extremity of the parish of West Retford, below Bollam, to the end of Grove-street in the marketplace of East Retford, a distance of 3300 yards, the surface fall to the water is only 15 feet 2½ inches. It would require the drains to be laid 10 feet deep, in order to dry the subsoil and any cellar 9 feet deep, but that would only leave a fall of 5 feet 2½ inches, for the whole distance, equal to 1 in 1900. If we were to keep the refuse of the town pent up in drains, with only a discharge during the night, the fall would only be increased to 10 feet, or an inclination of 1 in 990.

Thrumpton is at the southern end of the town, where the buildings have within the last few years increased more rapidly than in any other, and its distance from the best natural outfall is 4950 yards, rather more than 2¾ miles. The available fall for house drainage, with a continuous discharge, would be 7 ft. 8 in., or an inclination of 1 in 1937. For a discharge in the night only, 12 ft. 6 in., or a gradient of 1 in 1188.

I should recommend therefore the site of the old Grammar School, as the most suitable in every way, and there put down steam-power, and construct a well, to which a system of earthenware pipes would converge with sufficient fall, and thence pump the sewage water to a sufficient height for its distribution for agricultural purposes; or, when not required by the farmers, to a discharge pipe immediately below the surface, so that it might become deeper in its progress and have a greater inclination than the natural surface of the land.

For raising the water, and for drainage, I should prefer two small engines to one of larger size, because the same power, divided, would be more easily controlled and adapted to circumstances. In case of accident to any part of the machinery of one, the other, by increased speed, would be able to perform the work until the necessary repairs were effected. Again, the service reservoir for water, and the filter-beds, being constructed to contain a week's supply, the two engines could unite their strength in pumping the drainage during storms, and thus the aggregate horse-power and wear and tear, to be permanently provided for,

would be reduced to the minimum necessary for daily use. Another important adaptation of economical principles in the arrangement is, that in the summer season when the rain-fall is the least, the consumption of water for drinking and domestic purposes is greatest. And further, in dry weather, when the gardens and suburban land would most require its application, the liquid sewage manure would be in its most concentrated state, and could be raised by a stand-pipe to a sufficient altitude for such application; while in winter, or when the ground was unfit for its reception, and the sewage diluted and in great force, the same engine-power would raise the increased quantity of fluid to such height only as might be necessary for its discharge.

In this system I do not contemplate the collection and raising of the whole of the rain-fall, but only of that portion falling upon buildings, courts, and streets (except the streets in the immediate vicinity of the becks), and the whole of the water supplied for domestic and other purposes. The becks are sufficient for the removal of a great body of water from the lands above the town, and will thus prevent floods, with the additional means to be provided. The mere existence of these becks is not so objectionable; the great evil is, that heretofore they have been made the receptacles of all such offensive animal and vegetable substances as have *not* been allowed to remain stagnant and putrefying on the surface of the town. It is essentially necessary to the health of the population that these conduits should cease to be so used, and then, as clean brooks of surface land-drainage water, they would form useful auxiliaries to a system of perfect town-drainage.

In that system all the abominable cesspools must be abolished; the privies converted into soil-pan apparatus or water-closets, and the streets, houses, courts, and privies must all be drained into underground channels, so that everything that might become offensive or injurious may be removed before decomposition takes place.

In estimating the cost of the drainage, I am necessarily under the disadvantage of having no working plans before me, and therefore am unable fully to enter into such detail as is desirable. I have endeavoured, however, to make the estimates as accurate as was possible under the circumstances.

Estimates for the Construction, &c., of Drainage works.

	£.
Receiving well	44
Steam-engine	840
Earthenware street-drains	3520
Carried forward . .	4404

Brought forward . .	£ 4404
House, court, and privy drains, with soil-pans and traps	2152
Conveying pipe from well	660
	7216
Sinking-fund for wear and tear, depreciation, &c.	546
	£ 7762

The annual instalment required to repay this in 30 years, with interest, is 459*l.* 4*s.* 9*d.*, equal to 7*s.* 5½*d.* per annum for each house, or rather less than 1¾*d.* per week.

This, as in the case of the water supply, would be the amount if the cost were equally distributed over all the houses. There remains, however, the current expenses for coals, and the wages of the attendant on the engines, and if we consider these to be defrayed by the additional charges upon the occupiers of large houses, publicans, and brewers, and the revenue to be derived from water supplied for other purposes, we may fairly conclude that the above is the maximum which any cottager will be required to pay.

Land Drainage.—After the remarks made in the early part of this Report, and the evidence adduced as to the condition of the clay-land in the district, it is unnecessary to say more than that the health of the inhabitants would be improved, and the farmer greatly benefited by the thorough drainage of all the clay-land on the east side of the river Idle; and that by the inclusion of all the parishes in one district for all the purposes of the Act, this could be effected through the agency of the Local Board, and the repayment be distributed over a period that would bring the improvement within the reach of the poorest farmer, without being felt as a burden.

Sewage Distribution.—Engine power being already provided for the drainage of the town, the sewage manure could be applied to the land with the greatest facility, by means of earthenware-pipes laid at a small cost to the farms or gardens, and then distributed by a flexible hose and jet-pipe. The sand-land of the district is already in a state to receive it with advantage. The clay-land ought to be previously drained in order to attain the high state of fertility which this mode of manuring is capable of imparting. Still, in the present state of such land, the sewage could not be laid on without a considerable increase of the crops. The sewage of a perfectly drained town contains all the animal and vegetable matters previously derived *from* the land, and the proposal is, to return the elements of such animal and vegetable organisms to the soil, in a condition to be easily taken up and assimilated by the roots of plants. It is unnecessary to advert to

instances which prove that the rental of land so manured has been increased five and even tenfold.

In order to show the mutual advantage to be expected both to the farmer and the inhabitant of the town from the proper use of this fertilising fluid, I need only add, that, according to chemical analysis, its value to the suburban land is worth 20*s.* for each individual of the town population.

Improved Paving.—I have already stated that the pavements of the public streets, especially in the borough. are well laid, but that in the villages and back parts of the town, and in the court-yards generally, the pavements are in a state quite incompatible with the cleanliness and health of the people. In many places there is no pavement whatever, and, in some, pebbles have been laid, which are not only unpleasant to the feet, but retain in their numerous interstices a large quantity of refuse, and expose a corresponding surface to evaporation and decomposition. A cheap, durable, and impervious pavement is formed of gas-tar mixed with gravel or ashes, and the addition of a little lime. Its cohesiveness is so great as to produce scarcely any dust or mire, and its properties of turning water and presenting a smooth even surface, admit of its being washed and kept perfectly clean. If courts were paved with this composition the cost would have to be charged as a private improvement rate. Such pavement in the public streets of any of the parishes would be a special district rate, but in neither case would the charge, according to the nearest calculations I can make, exceed one halfpenny per week, taking the average of the houses.

Public Cleansing.—With such pavements, an abundant supply of water, and a system of complete drainage, the whole surface of the town can be cleansed at stated periods, and as frequently as occasion may require, by means of flexible hose, screwed on to the public fire-plugs, and the application of jets of water, at a further cost of not more than one halfpenny per week per house.

Improvement of Villages in the District.—In preparing this Report on four separate Preliminary Inquiries as to the sanitary condition of as many distinct parishes, I have been compelled, at the risk of appearing prolix, to say frequently almost the same things of each; but, in considering the questions of water supply, and the drainage of buildings, I have confined my attention to the borough of East Retford, and to such parts of the parishes of West Retford, Ordsall, and Clarborough, as, taken together, form the town of Retford. The evidence has, however, shown that the drainage, &c., of the villages of Ordsall and Clarborough is in a most defective state. These places must be separately and dif-

ferently treated, because they cannot be included in the same works with the town.

The population in each is comparatively small, and the houses irregularly built and straggling. It would probably be unnecessary to construct distinct water works for each of them; but the present mode of supply is capable of much improvement and extension; most of the evils connected with the drainage may be remedied; the pavements improved by the application of scientific management, and the distribution of charges provided for by the Public Health Act; and the offensive accumulations which everywhere abound removed, and in future prevented.

I do not think it necessary to prolong this Report by estimating the cost of such improvements. Compared with the advantages which will accrue the expense will be trifling.

The Local Board will be elected by the ratepayers, and will themselves be interested as considerable ratepayers, and the General Board of Health will endeavour to secure to the inhabitants the greatest efficiency, combined with the utmost possible economy in the construction of such works as may be necessary for the sanitary improvement of every part of the district. I will only add on this topic, that the cost of such alterations in either the village of Ordsall or Clarborough would have to be defrayed by a Special District Rate, and, by the same rule, the inhabitants of these villages would not be chargeable with any portion of the expense of draining and providing water for the town of Retford. The charges to be levied under the Act will in no case extend beyond the limits of the benefits to be conferred by its application.

Burial Grounds.—The burial-ground of the borough and parish of East Retford ought to be closed without delay; and any future interments on the south side of the burial ground of West Retford prevented. A cemetery should be provided for the population of those parishes at a convenient distance, and in such a situation as not to affect the health of the town. The burial-grounds of Clarborough and Ordsall are unobjectionable, and the latter is not at a great distance. If a field could be added to it as a town cemetery, there would require no building to be erected, but merely an arrangement respecting the fees. Something must be done, and I make the suggestion as perhaps the best mode of securing a desirable object, without incurring great expense, or wounding the sincere prejudices which some people entertain against any idea of an interment that is not under the shadow of a consecrated building.

Extent of District, and Constitution of the Local Board.—I am of opinion that all the town, borough, and parish of East Retford, and the whole of each of the several parishes of West Ret-

ford, Ordsall, and Clarborough should be united into one district for all the purposes of the Public Health Act. After what has been stated in the earlier part of this Report, I might safely ground this recommendation on the necessity of the case.

The sanitary defects of none of them can be effectually remedied if the others be excluded. But there are other reasons, in themselves sufficient. Each of these four places has petitioned for the application of the Act, and, as they are closely connected, the consolidation must lead to great economy in office expenses, salaries, and all other charges authorized to be defrayed by the General District Rate; to unity of action on the part of the Local Board of Health, which, if divided, would undoubtedly contain the elements of conflicting interests and jurisdictions; and to efficiency and economy in the works, because they would be constructed and managed as parts of one system, and because the united Board would be able to secure the services of a more scientific local engineer than any of the parishes separately could hope to obtain.

In pursuance of this, and as the best arrangement for the whole district, I would further recommend that the Local Board consist of 28 members, including the whole of the town council of the borough of East Retford; 3 members to be elected for the parish of West Retford; 3 members for the parish of Ordsall; and 6 members for the parish of Clarborough.

And also, that the members so to be elected for the several parishes of West Retford, Ordsall, and Clarborough shall be required to possess the same qualification as is necessary for the members of the town council of East Retford.

SUMMARY OF RECOMMENDATIONS AND CONCLUSIONS.

I. That there is much endemic disease both in the borough of East Retford, in those parts of the parishes of West Retford, Ordsall, and Clarborough which, with the borough, make up the *town* of Retford; and also, in the villages of Ordsall and Clarborough.

II. That epidemic typhus occasionally occurs in certain localities in East Retford, and in the villages of Ordsall and Clarborough; and that in the town of Retford, generally, there is a great excess of preventible sickness and mortality.

III. That from its favourable geographical position, considered physically, the genial nature of its climate, and the character of the occupations in which its population is engaged, the town and district ought to be one of the most healthy.

IV. That with the exception of the pavements in the principal streets of the town, there is an entire absence of any sanitary arrangement in the district.

V. That there exist in the filthy privies and cesspools large accumulations of animal and vegetable matter in a state of decomposition; and in the stagnant drainage, open ditches, and ill-ventilated streets, courts, and dwellings, abundant causes of the excessive sickness and mortality already stated.

VI. That the burial-grounds of East Retford and West Retford are in so crowded a condition, as to be quite unfit for the interment of the dead; and that further interments should not be permitted therein, except on the north side of the West Retford churchyard, but that a suitable cemetery should be provided at a convenient distance from the town.

VII. That the health of the inhabitants would be much improved by—

1. A constant supply of filtered water conveyed into every house in the town.

2. A system of thorough deep-drainage of the site of the town and villages.

3. The substitution of soil-pan apparatus, or water-closet, for the present offensive privies, and the removal in underground channels of all decomposing liquid refuse.

4. Improved paving of streets and courts.

5. Public washing and cleansing of streets, courts, and the general surface of the town with flexible hose and jets of water.

6. By preventing the pollution of the ancient becks, formed only to carry off flood-water.

VIII. That these objects may in all probability be effected at the following rates per week for a cottage house:—

1. Supplies of water not exceeding *one penny and half-penny.*

2. Street, court, and house drainage not exceeding *one penny three-farthings.*

3. Paving of courts and private roads, *less than one half-penny.*

4. Public cleansing of streets, courts, and alleys, *at one halfpenny.*

IX. That there is in the district much land on the east side of the valley of the Idle, very imperfectly drained, and that such land will be greatly improved by the application of the Act.

X. That these improvements will effect a great saving to the inhabitants, and therefore the application of the Act will be a great boon to the district at large.

XI. That as steam-power is necessary for drainage and the supply of water, the sewage manure and liquid refuse of the

town can be applied to the land with the greatest facility and advantage, and so as to produce a large revenue to the district.

XII. That the district should include the borough of East Retford, and the whole of the several parishes of West Retford, Ordsall, and Clarborough.

XIII. That the Local Board of Health should consist of 28 members, including the town council of East Retford; 3 members to be elected for West Retford; 3 members for Ordsall; and 6 members for Clarborough.

XIV. That the qualification of the members of the Local Board elected for West Retford, Ordsall, and Clarborough be the same as that required for the office of Town Councillor in the borough of East Retford.

I have, &c.

WILLIAM LEE.

The General Board of Health,
&c. &c. &c.

APPENDIX.

WE, the Mayor, Aldermen, and Burgesses of the Borough of East Retford, in the County of Nottingham, by the Council of such Borough, do hereby, in pursuance of the powers and provisions of an Act of Parliament, made and passed in the 11th and 12th years of the reign of Queen Victoria, intituled "An Act for promoting the Public Health," and called "The Public Health Act, 1848," consent and agree that the Borough of East Retford shall, for all the purposes of the said Act, be included in a District not exclusively consisting of such Borough.

Given under the common and corporate Seal of the said Borough in Common Council assembled, this fourth day of June, in the year of our Lord one thousand eight hundred and forty-nine.

(Signed) WM. MEE, Mayor. L.S.

W. NEWTON, Town Clerk.

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